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Decline and Rise of Clusters?

An evolutionary-institutional approach

Michael STEINER¹

1. Introduction

The notorious remark by Mark Twain (1897) that “the report of my death was an exaggeration” may also be applied to the recently revived and intensified debate about the usefulness of the cluster concept. This debate first focussed on and criticized several main points of a predominantly Porterian but also somewhat outdated “Italian” industrial district version of economic agglomeration. Yet at the same time these criticisms imply that additional elements may give rise to a differentiated concept of clusters and of the analysis of the conditions under which geographically condensed forms of cooperations between firms, public and semipublic institutions and research organizations may lead to a broader understanding of regional innovation processes.

The main points of critique towards the Porterian model but also towards too vague concepts of clusters can be outlined by the following quotations:

- According to Martin/Sunley (2003, 29) the “siren of universalism” pulls the cluster concept into shallow water, its heterogeneity and lack of causality and determination makes it overly stretched, thin and fractured. Major weaknesses of the Porterian model are the neglected issue of geographical scale (“stretching alarmingly from the local to the national and back again with bewildering facility”), the famous “fallacy of composition” where specific case studies are taken to represent some general conditions, the static character, the selling of the concept as a policy panacea.
- Another – indirect – critical assessment of interpretations of economic networks is given by Zuckerman (2003, 545) who “(i)n the face of such cacophony” (i.e. wide variations in subject matter and analytical style concerning economic networks) suggests three conceptions: networks as concentrated exchange, as primordial affiliations, and as structures of mutual orientation. Each of them has a different emphasis: the first interprets the ties as market exchanges (albeit more concentrated than is expected by orthodox market models), the second regards economic interactions shaped in consequential ways by ascribed relationships (and hence insists that market interaction could not be understood without attention to the social relationship), the

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third emphasizes the specific and different ties leading to “sociometric” networks. Yet all the interpretations have to grapple with some basic questions: can it be established that the structure of the networks has causal implications for the agents of interest, how strong is or can self-interest be in such networks, how much choice is involved in the selection of ties, is there a fitting theory of the firm that might explicate the pattern of relation, how passive (or necessarily active) are the network links?

- In a similar vein Maskell and Kebir (2005) point to a lack of conceptual clarity and – very outspoken – to “the risk that the cluster concept will join those rare terms of public discourse that have gone directly from obscurity to meaninglessness without any intervening period of coherence” (p. 2). They nevertheless admit that the cluster phenomenon has attracted increasing attention. As necessary elements of a “qualified” cluster theory they quote the questions of ‘what’, ‘how’, ‘why’ and usually also of ‘when/where/who’.
- Not so much a lack of conception, but its plurality is another point of criticism: ideas from quite different conceptual approaches – sometimes complementary, sometimes contradictory – are included in the discussion of (industrial) clustering (Gordon/McCann 2000, 2005). Yet – despite having different approaches – the cluster concept is sometimes reduced to an idealized typology of an industrial cluster with specific behaviour involving many small firms benefiting from flexible inter-firm alliances, supported by mutual information exchanges of both an informal and formal nature. This leads to the question – from the point of view of innovation theory – why this type of cluster should be regarded as superior to other kinds of arrangements and relationship between geography and industrial organization. This opens the perspective for different hypotheses about the geography of innovation.

Despite these criticisms there is a common understanding – also among the above mentioned authors – that clusters are a still widely researched and equally widely used concept for regional and innovation policy. Implicit in this respect for an albeit vague concept is the conviction – and this is the starting point for this paper – that it serves as a unifying approach for important elements for the changing character of the innovation process:

- New forms of evolutionary economic behaviour enter the interpretative framework of economics emphasising the role of interaction and coordination processes in the economy that are beyond the individual maximising concept and marked by bounded rationality (Nelson / Winter 1982; Simon 1991; for a recent overview see Foster and Metcalfe 2001). Vast recent

research points at networking capabilities as a key factor to innovate and at the fact that the core of innovative capacity resides in the capacity of efficiently combining different pieces of knowledge by various agents and agencies (for a compilation see Ronde/Hussler 2005). Innovation has to be regarded as an evolutionary and social process of collective learning.

- The regional dimension gains new importance especially for the exchange of knowledge and for learning processes; here the focus is on the necessity and forms of proximity for knowledge exchange (Rallet and Torre 1998), on the specific character of knowledge and its aspect of regional governance (Gertler 1997, 2001; Maskell and Malmberg 1999). This does not only lead to a general and diverse regionalization of innovation policy (Fritsch/Stephan 2005) but furthermore to 'regional knowledge capabilities' that help metamorphose macro-processes through ground-up globalization (Cooke 2005).
- A third element is the necessity of guiding and coordinating institutions for these new forms of behaviour on a regional level. Interactions need institutions (such as markets). Yet if the focus is on learning and knowledge sharing markets alone will not suffice for these forms of interaction and additional institutions will be needed. The problem then consists of finding and constructing institutions that reduce and metabolise complexity through a dynamic process of distributed learning (Rullani 2002) with the open question if it is possible to get from specific industrial cases to a general economic model (Curzio/Fortis 2002).

Clusters and their networks combine these three elements. In chapter 3 an evolutionary and institutional framework will be outlined for an interpretation of clusters that includes these elements: clusters will be interpreted as a useful concept for an analysis of factors moulding economic performance in the sense of supporting the diffusion of knowledge within a regional context. Chapter 2 will give before a short outline of changing perspectives in the interpretation and legitimization of clusters. Chapter 4 will point to new directions of research from these perspectives.

2. From agglomeration to organizational learning and knowledge exchange

The emphasis of cluster analysis has certainly changed in recent years. The original concentration on clusters as “geographic concentrations of interconnected companies, specialized suppliers, service providers, firms in related industries and associated institutions in a particular field that compete but also cooperate” (Porter 1990 and 2000) was extended to the specific forms but also limits of cooperation. The recent renaissance of interest has focussed more on clusters and networks as an institution for knowledge management and organizational learning emphasizing the organic-evolutionary dimension. Growth of the knowledge base depends on intended and unintended individual processing of experiences, i.e. ‘learning’, while the interpretation, transfer and use of experiences is influenced by interaction between individuals and between organizations (Cohen/Levinthal 1989, Anderson 1995, Hartmann 2004).

In fact, this was already outlined by Alfred Marshall (1890/1920): Economic success of firms depends of an increasing specialization and of the development of a more efficient organization of industrial production relying on material linkages, technological spill-overs and labour market pooling effects. Yet besides this well-known triple of reasons for agglomerative tendencies and their benefits Marshall offers many more insights for a dynamic interpretation of clusters. The new element of Marshall's idea lay in the dynamic complementarity of this system of interdependent economic units: Up to then efficiency raising specialization rested either on scale effects of the single production units or on external comparative advantages. Marshall thus points to the organic-evolutionary character of independent decision making units, i.e. these effects exist also without a hierarchical command or control structure. Loasby (1998, p.70) therefore emphasizes Marshall's ideas as a theory of economic development, as an early “evolutionary” theory where the “principle of differentiation (is) combined with integration”: Forms of organization should not only be judged by their implications for allocative efficiency, but primarily by their effectiveness in aiding the growth and use of knowledge (Marshall, 1920, 138). In addition to this differentiation between allocative and creative functions of the market which are of specific concern for a dynamic interpretation of regional development (Steiner 1990) Marshall further develops A. Smith's idea of specialisation insofar as he outlines the importance of the generation of variety within each specialism and – furthermore – the existence of two kinds of variations: between and within specialisms. This opens the view for interpreting clusters as not only competing against each other but as

producing variety also within each cluster. This leads Loasby in his interpretation of Marshall to view clusters as a “scientific community” with both the task of restoring tranquility and of “devising intimate connections which exploit the advantages of the increasing subdivision of functions within the economy” (p.78).

The focus on learning and knowledge creation as a special aspect of the cluster debate was revived by the experience of petrified clusters in the former old industrial areas in the 1980s (Steiner 1990, Tichy 1998, 2001): the importance of learning within clusters was emphasized by the fact that cluster petrification is a major risk in practice, and that such petrification arises when lack of knowledge acquisition and learning leads to insufficient performance. The underlying hypothesis of a regional cycle – in analogy to the product cycle hypothesis – has as a main argument that lock-ins of technological and/or political nature act as barriers to innovation and prevent the adequate renewal of skills (Tödtling/Trippel 2005).

In the middle of the 1990s concepts of learning therefore were integrated in theories of regional development and cluster analysis: the “learning region” (Florida 1995, Asheim 1996, Morgan 1997) interpreted the region as a focal point of a general “learning economy”. The challenge in respect to clusters was the fact that they were regarded up to then as capable only (and at best) for incremental innovations. Yet this is not sufficient in face of the new economic situation and its logic: “The challenge of ‘learning regions’ is to increase the innovative capability of SME-based industrial agglomerations through the economic logic by which milieu foster innovation.” (Storper 1995, 203) But this meant an additional quality of interaction within regional clusters in their emphasis on horizontal cooperation and deliberate interactive processes of developing new perspectives: “Such ‘learning regions’ would be in a much better position than ‘traditional’ industrial districts to avoid a ‘lock-in’ of development caused by localized path-dependency” (Asheim 1996, 395).

Yet in this concept the description of the necessary contents and the detailed processes of learning activities remained rather schematic and unspecific. So it was a necessary first step in emphasizing the need for entrepreneurial learning, innovation and spatial proximity but with rather vague definitions and a lack of empirical foundations (Hassink 1997).

A further step was the perspective of “interactive learning” referring to the basic ideas of Lundvall (1988, 1992) in connection with the regional dimensions of innovation systems yet because of its spatial dimension also interpreted in terms of clusters (Morgan 1997, Antonelli and Quèrè 2002). Learning here is conceived “as a set of activities in which all kinds of knowledge are (re-)combined to form something new” (Meeus et al. 1999, 5). The notion of interaction

necessary for learning has two dimensions: on the one side it describes the structure of interaction, on the other side the way of interaction between the various partners: "... the overall innovation performance depends not only how specific organizations like firms and research institutions perform, but how they interact with each other and with the government sector in knowledge production and distribution. Innovating firms operate within a common institutional set-up, and they jointly depend on, contribute to and utilize a common infrastructure" (Gregersen/Johnson 1997, 483). Connected with this "interactive learning" approach was the insight that learning cannot be reduced to acts of transaction and hence surpass the realm of transaction cost analysis – the establishment of economic competence at the level of an organization and in networks of organizations is an interactive process calling for a different analytical perspective (Lundvall 2002, 28). Learning accordingly turns into an interorganizational cooperation and communication process at the supra-firm level with an automatic recombination of knowledge leading – more or less automatically – to increased innovation.

Collective learning centres on the development of a regional knowledge base (Camagni 1991, Lorenz 1992, Lorenz and Lazaric 1998, Keeble and Wilkinson 1999), is closely connected with interactive learning yet more focussed on industrial districts and clusters: "... regional collective learning involves the creation and further development of a base of common or shared knowledge among individuals making up a productive system which allows them to coordinate their actions in the resolution of the technological and organizational problems they confront" (Lorenz 1996, 18). Central for the emergence of collective learning is the existence of a cluster with organizational, institutional and social proximity of all participants (Lawson 1997). Learning here becomes a positive dynamic externality, the regional knowledge base gets the character of a public good: "In this way, the creative knowledge accumulates outside the firm, and becomes a club good: no rivalry exists for its use by agents belonging to the club, and external agents are barred from access" (Capello 1999, 357). This club-like character of the networks proposes a stronger territorial focus: territoriality guarantees the opportunity for frequent contact, but it also permits and supports the existence of a common language and code of understanding.

Further steps centered on specific elements of the development of the (mostly regional) knowledge base and their interactions asking for the units of operation that interact when a system of information is formed. So the "Triple Helix as an analytical model (of innovation) adds to the description of the variety of institutional arrangements and policy models an explanation of their

dynamics” (Etzkowitz/Leydesdorff 2000, 112). Here the specific interaction between university-industry-government is considered to undergo observable reorganizations in their relation. These relations create specific knowledge spaces with different types of networking which form the basis for interactive or spiral experiences (Casas et al, 2000). This approach was criticized for “emphasizing the consensus aspects of relations among such distinctive ‘epistemic communities’” (Cooke 2005, 1129); it is inadequately contextualized and overlooks the asymmetric knowledge problems – it is a weakness of most universities to act as knowledge transceivers. This led to ask for methods of managing knowledge, including also intangible assets, of regional networks. Originally developed to report the contribution of human competences, knowledge and skills to a company’s value (Grasnick/Ploder 2002) there have been also attempts to raise it to the level of clusters from a perspective of organizational learning including structural capital (such as organizational routines, data bases, procedures) and relational capital (cooperation with political decision makers and other networks). The basic intention is to develop methods for monitoring also the intangible assets of regional networks (Dösinger et al. 2003).

These recent developments in the interpretation and analysis shifted the emphasis from material links to immaterial knowledge flows within clusters and pointed to the need for connectivity between the different agents for knowledge creation and diffusion. This then leads to further questions concerning to what degree clusters are to be regarded as non-market devices by which firms seek to coordinate their activities with other firms and knowledge-generating institutions. Ongoing learning processes between firms and within clusters stress the importance of institutional arrangements for the generation of knowledge and learning networks which are not available in the markets (Maskell/Malmberg, 1999).

All these aspects and perspectives of the function clusters can fulfil emphasize the need of an institutional embeddedness of technological opportunities, routines, diverse forms of market interaction and selection processes. This leads to further reflections on the evolutionary character of those institutions who coordinate the mechanisms necessary for and leading to sustained processes of innovation and change.

3. Evolutionary and institutional elements of clusters

Looking from the perspective of evolutionary and institutional analysis at clusters yields additional insights into their specific character and their usefulness for the development of technology and support for innovation. The recent renaissance of interest in institutions as a factor shaping economic performance has implications also for the creation and sustained existence of clusters as a tool for knowledge management and as learning organizations within and across regions. Knowledge creation and technology management is not an automatic outcome of individually rational behaviour but needs guiding institutions such as clusters and networks. Several general ideas of institutional economics (be they “old” or “new”) seem to be of relevance and help to underline the institutional character of clusters in the process of technological development.

3.1. Clusters as social technologies

The very basic idea of institutionalism underlines the fact that individual behaviour is the effect of social institutions moulding behaviour and that voluntary interactions are in need of shared institutions. Loasby (2003, 102) accordingly defines institutions as “(relatively) stable frameworks for decisions and action: intentional action is the result of cognitive processes which require an institutional basis that is not simultaneously open to revision”. Influenced by institutions intentional action turns into routines and habit-formation. This habit-formation becomes the more important the more cooperation - instead of competition - is needed: Innovation and productivity gains are based on subtle forms of cooperation, where the creation of new knowledge implies an intense process of interaction which cannot be explained solely out of individual decision making. This is of additional importance if we interpret - as formulated as one of three possible interpretations by Zuckerman (2003, 550) - economic networks as “economic interactions that are shaped in consequential ways by ascribed or ‘primordial’ relationships where habits are influenced by institutions that pre-exist the market”.

Institutions matter specifically when we deal with innovation and its essential characteristics of uncertainty and knowledge sharing. Innovation processes in developed economies have essentially been marked by differing forms of innovative milieus and their supporting institutions. Evolutionary economics - as a special interpretation of the institutional perspective - sees these institutions as a moulding device for the technologies used by a society. Loasby (2003, 100) defines evolution as a “process, or cluster

of processes, which combines the generation of novelty and the selective retention of some of the novelties that are generated". In the context of this evolutionary perspective, drawing on Nelson/Sampat (2001) and Nelson (2001), institutions can be regarded as "social technologies" where "physical technologies" are a kind of recipe which works regardless to the division of labour, whereas "social technologies" are the specific mode of coordination once there is a division of labour. Social technologies involving "patterned human interaction" become institutions as soon as they are regarded by the relevant social group as standard and become attractive ways to get things done. In Nelson's perspective this concept encompasses ways of structuring activity not only within particular organizations but also across organizational borders: They are not so much constraints on behaviour but rather an effective support as soon as human cooperation is needed (Nelson 2001, 24).

Clusters accordingly can be interpreted as a specific social technology for the coordination of the knowledge intensive use of physical technologies – they are a form of productive pathway coordinating human action and combining different factors that are important for growth such as technical advance, physical capital, growth of human capital. Clusters as social technologies are an answer to the problems of achieving agreement and coordination between separate decision making units within a given spatial dimension. They combine different additional elements that are important for regional development and economic growth.

3.2. Clusters as Coasian institutions

Clusters then become specific institutions within the innovation system within which different levels exist. Within these systems there is a "pervasive interactivity and interconnectedness between elements of systems, pointing to the importance of linkages (or the effects of their absence) within innovation systems (and broader socio-economic systems)" (Bryant 2001, 369). These systems operate at several largely self-organizing hierarchical levels, which yet are never fully isolated. Clusters at the regional level are one specific perspective in this system.

For an institutional perspective different levels of social analysis therefore have to be regarded. Williamson (2000, 596ff) distinguishes four of them: The top level – the level of social embeddedness – locates the norms, customs, mores, traditions which for institutional economists is regarded as given; the second refers to the institutional environment in the sense of formal rules such as constitutions, laws, property rights; at the third level questions of governance are solved whereas only the fourth level is the domain of the usual questions of economics concerning the

problems of resource allocation and employment. It is the third level that offers itself for questions of cluster analysis in the form of specific governance structures which influence contractual and network relations. Alluding to the triplet of Commons (1932) of conflict, mutuality and order Williamson sees governance as “an effort to craft order, thereby to mitigate conflict and realize mutual gains”. The prevailing governance structures hence reshape the incentives.

We also have different forms of governance – markets, hybrids, integration. These hybrids offer themselves as a middle way between methodological holism and methodological individualism (Toboso 2001). According to Williamson the degree of specificity of investment influences the form of governance. It is also the effect of the new information technology that there is a strong presumption for network organization in the domain of hybrids (Williamson 2000,72).

In this line of reasoning clusters can be viewed as a specific “mode of governance”, as a form of Coasian institution, which tries to integrate the positive external effects of innovation, technological knowledge and development activities. The creation of such institutions may be put in question by high transaction costs. Yet, because of the specific asymmetric and tacit character of technological knowledge, these transactions have to be mediated by non-market methods. Primarily, these transactions are mediated through networks and other forms of arrangements between organizations and individuals, such as procedures which build trust and work to limit the damaging consequences of asymmetric information. Clusters can be regarded as economic clubs, which act as institutions for internalizing the problems of effective knowledge transmission. As such, networks are considered a substitute both for formal markets and for organizational integration. They therefore fall within the perimeter of non-market devices, which firms use to coordinate their activities with other firms and with other knowledge-generating institutions.

3.3. Between social networks and modes of governance

Regarding clusters as a kind of Coasian institution begs the “second Coase” question (as raised by Granovetter 1994) – why do firms have costly cooperations with others and get embedded in social networks?

Underlying this question are two contrasting models of institutions (Schmid/Maurer 2003). The sociological approach assumes that coordination mechanisms solely based on decentral decision making do not suffice to establish order needed for continued interaction but that a social process is needed which

guides this individual behaviour – human action does not need so much the assumption of rational behaviour but has to be regarded as guided by rules. Individual behaviour is therefore in need of institutions that lead to functioning social relationships. Exchange is only possible once the agents have agreed on institutions that allow such an exchange. The “exchange” specifically of knowledge then is only possible once there is a sufficient embeddedness and social capital that enables the firms to share their knowledge. Institutions here have “primordial” character.

This differs from the economic approach where agents/firms make decisions that form institutions. Interpreted in terms of clusters firms decide to form clubs because they regard it as an efficient way to participate in and to contribute to the generation and diffusion of knowledge. Transaction-cost oriented economics – as outlined by Williamson (2000, 2002) – goes one step further. Social embeddedness is regarded as a higher level of institution and – once regarded as given for considerable amounts of time – influence the choice of contract between market and hierarchy. Once social embeddedness is given, and also adequate property rights, firms can decide about the forms of governance as a third level of institution. The resulting governance structure then reshapes incentives. Here these institutions are the result of deliberate choice.

Taking these question-answer-positions for granted additional insights can be gained by “embedding” the organizational environment into the analysis of transaction problems (Ipsen 2002) and emphasizing the phenomenon of knowledge with all its specific characteristics of being tacit, largely public, often asymmetric and cumulative. Here the rationality of the decision is reduced because of the limited information regarding the knowledge to be received so the behaviour can not follow any more the usual economic rules of maximizing – deliberate choice is subject to bounded rationality. To this changed behaviour adds another element: Transactions – as emphasized by Helmstädter (2003) – are, once dealing with knowledge, no more the usual and simple transaction of exchange of goods, but contain strong elements of sharing. The usual rules of economic decision making underwent a double change: both the assumption concerning behaviour as well as the assumption concerning the environment under which decisions are taken – once knowledge is the object – obey other rules.

This leads to the conclusion of the additional insights and implication (as asked by Williamson 1996) that can be gained by referring to the phenomenon of “social embeddedness” in analyzing transactional problems and choices of governance structures (Ipsen 2003, 206f):

- The organizational environment and the content of the transaction allows a deepened analysis of the choice of

governance - the more instable the environment, the less precise the character of the object to be “shared”, the less either market or hierarchy and hence the more hybrid forms of governance will be chosen. In dependence of moral hazard-risks and availability of social capital quite different types of hybrids may develop. This opens a research agenda for a deeper analysis of diverse cluster forms.

- The transaction relation is more than a “make or buy” decision oriented towards cost-efficient production. The transactional approach is too narrow to account for longer term aspects such as the adaptation to changing market conditions and also for the development of a knowledge base within and between firms. Special organizational forms, i.e. institutions, are of decisive importance for the solution of such complex decision problems.
- The isolated perspective of decisions concerning alternative governance forms therefore is not sufficient because it disregards the specific environmental situation and the content of the transactions; yet this applies also to the opposite perspective – behaviour is not completely determined by social relations, there are still decisions to be made.

So there is the challenge to combine individual acts of choice and institutional frameworks. From the perspective of the firm it is essential to develop such institutional frameworks in order to support the problem of choice under uncertainty and to reduce complexity.

3.4. Generating and selecting variety

Evolutionary processes are marked by the continuous appearance of various forms of novelty: adaption and discovery generate variety yet there is a need for collective interactions within and outside markets which work as selection mechanisms (Coriat/Dosi 2002, 96).

From this evolutionary perspective cluster activity is based on a different kind of logic, in which we have a paradigmatic change from an optimizing to an adaptive logic, which stresses the need for political intervention when the system fails. This adaptive logic is based on an Austrian, and in particular a Schumpeterian, evolutionary framework which interprets economic change in the following manner (Metcalf 1995, 1998; Steiner 2002):

Economic change is driven by the variety of economic results between competing and alternative possibilities ways of fulfilling needs. On the other hand, the variety of economic results depends on the variety of technical and organizational forms. Innovations introduce new varieties; yet imitation and competition consume variety, so that economic progress and economic change depend on

the balance of these two factors. Variety and diversity are therefore the main forces of economic progress in the context of a competition-oriented market economy. Policy-making has to look not for optimality but for variety and diversity. One principal concern, therefore, is the difference in the behaviour of firms and the resulting variety of experiments. This implies a specific interpretation of firm behaviour which contrasts with traditional theory, in that it is the outlier firm, and not the representative firm, that is the typical element. There is a substantial diversity between firms – in size, in competence, in knowledge of technological options (Bryant 2001). Thus the attention of the evolutionary policy-maker shifts away from notions of efficiency toward notions of creativity, and patterns of adaptation to market stimuli and technological opportunity. The evolutionary policy-maker therefore adapts rather than optimizes, and his central concern is with the innovation system and the operation of the set of institutions within which technological capabilities are accumulated. Findings on individual cognition and communication indicate that there is not only the problem of quantitative underproduction of knowledge in markets but also a problem of qualitative underproduction of variety of knowledge (Bünstorf 2003, 92). The canonical policy problem is thus defined in terms of the dynamics of innovation, in a world characterized by immense micro-complexity. Since creativity and the generation of variety are central to this approach, the question of the wider institutional structure which supports the innovative activities of firms, is of central concern. This support has primarily to be coordinated through non-market-mediated interactions – the unbiased generation and diffusion of knowledge cannot be expected to come about spontaneously (Bünstorf 2003).

A central fact about the modern process of innovation is that it is based on a division of labour, as clearly foreseen by Adam Smith. He early recognized what is now called the social nature of the innovation process. This division-of-labour induced social process produces efficiency gains from both specialization and professionalization, but also requires a framework to connect together the component contributions of the different agents. As far as knowledge and skills are concerned this aspect of connectivity, or technology transfer, cannot be effectively coordinated by conventional markets: we are in need of specific institutional arrangements.

3.5. Knowledge sharing versus division of labour

Yet – as has been outlined recently by Helmstädter (2003) – the aspect of connectivity transcends the usual problems of the “division of labour” – there are additional and non-trivial problems of

“knowledge sharing” so far not properly seized by New Institutional Economics. The main line of arguments runs as follows (Bödner/Helmstädter/Widmaier 1999, Helmstädter 2003):

- The pure transaction cost approach misses fundamentally the essence of knowledge as an economic resource. “The new institutional economics is dealing with institutions that govern the interactions taking place under the division of labour, but leaving aside the division of knowledge activities that go with it” (Helmstädter 2003, 14). Once the subject of interaction between participating actors is knowledge the character of interaction changes – the institutional conditions for an efficient division of knowledge are different.
- Social interaction processes – i.e. networks – have different subject matters of their interactions : Leaving aside the political network with the subject matter of political convincing, there are the networks of economic transactions and the one of knowledge sharing. The first belongs to the process of division of labour dealing with the exchange of goods and services, the second with knowledge.
- The main differences reside in the form of interaction and in the impact of interaction: under the division of labour it is transaction of goods and services subject to the rules of competition and their redistribution with exclusivity, under knowledge sharing it is knowledge and skills subject to cooperation and the increase of knowledge for all (inclusivity). Also the next steps are different: in the first case it is separate elaboration, in the second internalization and recontextualization.
- The most important “institutional” consequence is that “cooperation is the basic institution of the process of the division of knowledge” (Helmstädter 2003, 32). But the degree of cooperation depends again on the type of knowledge use: application has stronger competitive elements whereas the creation and the transfer are dominated by non-economic competition (status, acceptance) and mostly cooperation. The interest lies here in the institutions that make knowledge sharing efficient.

These strands of evolutionary and institutional thinking in the context of knowledge creation and sharing emphasize that connectivity and the desired efficiency cannot be effectively coordinated by conventional markets and stress the importance of institutional arrangements for the generation of knowledge and learning networks which are not all available in the markets. They also emphasize that the growth of knowledge depends on intended and unintended individual processing of experiences, i.e. ‘learning’.

while the interpretation, transfer and use of experiences is influenced by interaction between individuals and between organizations, i.e. 'organizational learning'.

3.6. Learning organizations

Learning if regarded as a social process of ongoing development embedded in a sociocultural (regional) context has become essentially a communicative process rather than a cognitive performance, requiring new thinking about the nature and forms of the transmission and dissemination of knowledge within a social and organizational context, such as the firm or a cluster (Cullen 1998). The concept of "organizational learning" – extended to clusters – is capable of highlighting some of these processes (Steiner/Hartmann 1999, 2006).

A learning organization is an organization skilled at creating, acquiring and transferring knowledge, and at modifying its behaviour to reflect knowledge and insights (Garvin 1993). Organizational learning is the outcome of three overlapping spheres of activity - individual, team and system learning. All three kinds of learning take place simultaneously (Dixon 1995). Learning systems are therefore the precondition for the transformation from individual learning to organizational and even interorganizational learning (Staehle 1991). As a medium of communication and exchange that function independently of the individuals involved, such systems enable collective learning in and between organizations. Organizational learning takes place when the organization develops systemic processes to acquire, use and communicate organizational knowledge, as learning is conceived as something, that should deliberately be pursued by the organization and its members. (Argyris and Schon 1978, Nevis et al. 1995, Pedler et al. 1991, Stankiewicz 2001). Organizational learning may be recognized by the existence of learning systems that are independent of the individuals (Shrivastava 1983). Thus, "integrative capabilities" belong to the most important factors for clusters as prerequisites for regional development. This means that different fragments of knowledge, competencies, etc. have not only to be accessed but also integrated into specific configurations. The prevalence of ongoing learning processes between firms and within clusters indicates the importance of institutional arrangements for the generation of knowledge and learning networks. They serve to fulfil additional functions such as reducing uncertainty about the experiential knowledge of others and increasing the incentives for medium and long term investments in diffusion channels (Maskell and Malmberg, 1999). Clusters can help to develop and adapt research, production,

distribution, and after-sales strategies to increase the capacity of participants to absorb new information and can contribute to raising the specificity of knowledge development, processing and diffusion within the cluster to strengthen incentives for the participants to concentrate their investments in the cluster and protect new knowledge against competing clusters.

4. Conclusions

"Whatever they are exactly, industrial districts are also a worldly success and a conceptual innovation" (Sabel, 2002, 107). Being aware that it is probably impossible to give a singular theory of clusters this paper argued that clusters support processes of knowledge generation, accumulation and diffusion – individuals and firms alone are from an economic point of view not capable of delivering sufficient amounts and varieties of knowledge. Therefore clusters as hybrid institutions are needed. Clusters can be regarded as a special form of governance providing a cognitive framework for transforming information into useful knowledge. It is the specific content, namely knowledge creation and diffusion, and not only the organisational form of networks that leads to clusters as specific institutions. At the same time they restrict and protect – more or less efficiently – this knowledge for cluster members generating incentives of belonging to the club. Yet the specific balance of deliberate choice and social embeddedness opens the room for quite different organizational forms.

As an evolutionary institution clusters are also exemplars of the relationship between economic organization and economic development (Loasby 1998). One important aspect of this perspective is that institutions like clusters are not automatically there but that they are the result of an evolving process shaped by policy activities and entrepreneurial behaviour responding to new challenges. This implies a changing character of institutions in support of knowledge creation and sharing – clusters as a form of “social technology” are co-evolving with new physical technologies and are therefore in a constant need to change themselves. Institutions are themselves shaped by economic behaviour and hence subject to change. Since there is definitely room for agency there is ongoing interaction between the agents and the clusters which is a driving force for the adaptation of clusters. So there is in-built endogeneity in the development of clusters: their institutional forms are exogenous in the short-run (so setting the framework for economic relationships and development), but become themselves endogenous over the longer run. The changing character of clusters – in forms of organisation, in the kind and mechanism of knowledge sharing, in their geographical reach – becomes a challenge for further research.

Cluster theorizing has to avoid universalism – there is not only strong diversity between clusters but also within. Clusters are highly differentiated across sectors, regions and countries. There is also no single model of knowledge transmission, also not within clusters. As already foreseen by Marshall variety exists also within clusters. So we still are in need of detailed studies on how knowledge is transferred and to what extent and how knowledge spills over – there is much unobserved heterogeneity. Recent case studies of knowledge exchange within clusters (Giuliani 2005, Giuliani/Bell 2005, Steiner/Ploder 2005, Steiner/Hartmann 2006) support the argument that knowledge transfer is by no means automatic, that proximity per se is not sufficient to generate learning between firms, that the forms of organized learning differs remarkably between clusters, that the diffusion of knowledge within clusters is highly selective and strongly dependent of the position of firms within networks and their absorptive capacity. This extends to questions of limits of the collectivity of learning and how to overcome it, of a necessary balance between internal coherence and external linkages, to the potentials and preconditions of knowledge exchange between clusters on a larger geographical (Europeanwide?) scale.

It would be an exaggeration therefore to report that the cluster debate is dead.

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